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(12) UK Patent Application (19) GB (11) 2 028 129 A

(21) Application No 7927847
(22) Date of filing
10 Aug 1979
(23) Claims filed
10 Aug 1979
(30) Priority data
(31) 78/33680
(32) 17 Aug 1978
(33) United Kingdom (GB)
(43) Application published
5 Mar 1980
(51) INT CL³ A62C 3/12
(52) Domestic classification
A5A 28
(56) Documents cited
GB 1454493
GB 1453836
GB 1341693
GB 819210
GB 815238
(58) Field of search
A5A
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(54) Containers and packings therefor

(57) A container for holding fluids is provided with an interior explosion- or blast-suppressive packing made up of discrete fragments of expanded metal foil, e.g. in the form of squares of the expanded foil.

GB 2028129 A

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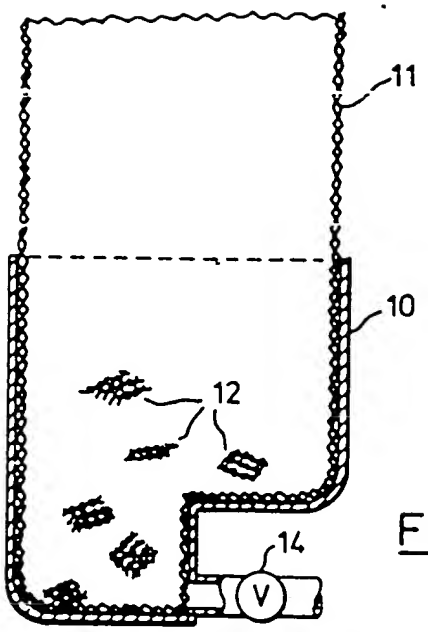

FIG. 1

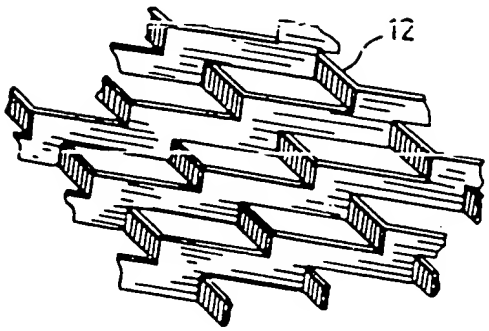

FIG. 2

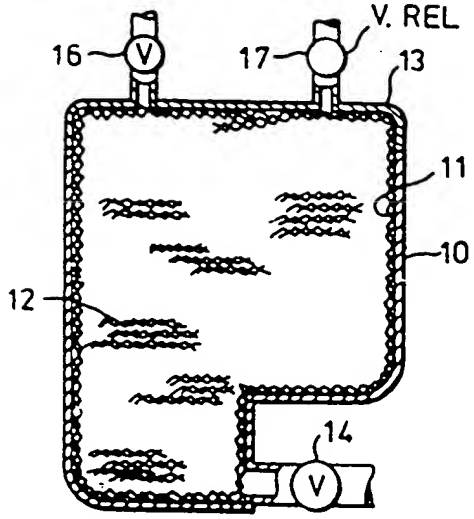

FIG. 3

FIG. 4

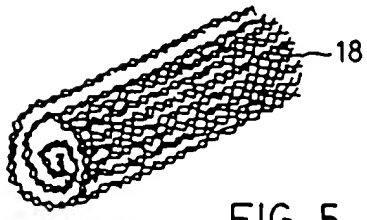

FIG. 5

SPECIFICATION

Containers and packings therefor

The present invention relates to containers for fluids i.e. liquids, vapours or gases, more especially but not exclusively inflammable fluids such as petrol or gasoline and propane, and, more particularly, to explosion- or blast-suppressive packings for such containers.

It is known to equip containers for fluids with a porous lightweight metal interior packing made from expanded metal foil. For example, in British Patent Specification No. 1,131,687, there is described a container with a filling of layers of a net-like material, the net-like material comprising a plurality of strands, the widths of which are misaligned with the general plane of the netting. One material which accords with that invention and which has been found to be relatively cheap and simple to produce is expanded aluminium foil. In the production of new containers wound cylinders or layered blocks of such expanded aluminium foil can be preformed and inserted into the container before it is closed. However, it is not possible to protect existing containers, such as fuel tanks in cars and domestic-size propane containers without having to open up one side or the bottom of such a container, and it is also difficult to fill irregularly shaped containers. These are serious drawbacks, not only because the time involved in introducing the packing into the container is increased because of the additional steps which have to be taken, but, in the case of existing containers, also because it is virtually impossible to reseal them completely satisfactorily. For example, with cylinders for liquefied petroleum gases such as propane, welding of the relatively thick walls of the container has to be monitored very closely, the weld material then smoothed down to lie flush with the external surface of the container and the container then re-annealed to ensure that it has the necessary strength to withstand the high internal pressures to which it is subjected in use.

Therefore, in order to overcome this problem and in accordance with the present invention, there is provided a container for fluids equipped in its interior with a porous lightweight metal explosion- or blast-suppressive packing comprising a plurality of fragments of expanded metal foil.

Such fragments may comprise small fragments of sheets of expanded metal foil, or, alternatively, small screwed-up folded, bent or wound masses of expanded metal foil.

It will be appreciated that such fragments of expanded metal foil can be inserted in existing containers through the inlet/outlet of such containers, so that the required amount of expanded metal foil can be inserted without having to take apart the container prior to insertion of the packing. When using the expanded aluminium foil available under the trade mark EXPLOSAFE from the Explosafe Division of Vulcan Industrial Packaging Limited, Rexdale, Ontario, Canada, it is desirable that the packing should have a density in the range from about 15 to 70 g per litre based on the bounded volume occupied by the packing, preferably about 20 to 50 g per litre and more preferably about 25.5 g per litre.

Depending on the use of the container so the volume of the container which the packing has to occupy will vary (although in most cases it will completely fill the container unless there is a supporting cage for the packing within the interior of the container) and, given a particular container, it is a relatively simple matter to ensure that sufficient packing is present in the container, by monitoring the weight of fragments fed to the container. This can be done with fragments of a uniform size by preweighing a sample of the fragments to produce an average weight for each of the fragments so that a given number of fragments will have a given weight, or, with irregularly shaped fragments of various sizes, by weighing the container in its empty condition and continuing to weigh it while inserting the fragments.

Preferably, the fragments will comprise a number of squares or rectangles of expanded metal foil, preferably aluminium, substantially 2" square, but crumpled balls of expanded metal foil or small wound cylinders of expanded metal foil may be used depending upon the application.

Although the invention is primarily concerned with introducing a packing into existing containers, it can be applied to new containers during their actual production in which case, for example with petrol or gasoline tanks for cars, a sheath of expanded metal foil may be laid in say the bottom half of the tank with parts of the sheath standing up out of the bottom part of the tank, and then a filling of expanded metal foil fragments inserted therein and the free ends of the expanded foil sheet closed down over the fragments. The top half of the tank can then be welded onto the bottom half. This method is particularly useful as the expanded metal foil tends to be extremely resilient so that after initial packing and compressing of the fragments of foil the mass of fragments tends to expand, thus causing problems if not otherwise contained. The folding-over of the free parts of the sheath prevents this.

The present invention will now be more fully described, by way of example only, with reference to the accompanying drawings in which:

Figure 1 shows a vertical section through a container during the operation of filling it with fragments of expanded metal foil;

Figure 2 shows a fragment of expanded

metal foil;

Figure 3 is a view similar to Fig. 1 showing the container in a later stage of assembly; and

Figures 4 and 5 show alternative forms of expanded foil fragments.

Referring to Fig. 1, an irregularly-shaped metal-walled container 10 is provided with an interior lining of sheath of expanded aluminium foil 11 covering the interior of the lower portion of the container with upper parts of the sheath standing up out of the container. A filling of small squares or rectangles of expanded aluminium foil 12, as shown in more detail in Fig. 2 is fed into the container. These may be formed by severing uniform squares or rectangles from a larger piece of the expanded foil and a predetermined number or weight of the fragments is fed into the container. Subsequently the free upper ends of the foil 11 are folded over to surround the packing of fragments 11 before attaching the top 13 of the tank e.g. by welding.

The example shown in the drawings in a container suitable for holding liquefied gas e.g. liquefied petroleum gas and has inlet and outlet valves 14 and 16 and a conventional form of safety pressure release valve 17.

Instead of employing squares or rectangles 12 of expanded foil in sheet form, the packing in the interior of tank 10 may be made using crumpled balls 17 of the expanded foil as shown in Fig. 4, or small wound or coiled cylinders 18 of the foil as shown in Fig. 5.

CLAIMS

1. A container for fluids equipped in its interior with a porous lightweight metal explosion- or blast-suppressive packing comprising a plurality of fragments of expanded metal foil.

2. A container as claimed in claim 1 wherein the fragments are uniform in size.

3. A container as claimed in claim 1 or 2 wherein the fragments comprise squares or rectangles of the foil.

4. A container as claimed in claim 1 or 2 wherein the fragments comprise crumpled balls of the foil.

5. A container as claimed in claim 1 or 2 wherein the fragments comprise small wound cylinders of the foil.

6. A container as claimed in any preceding claim including a sheath of expanded metal foil lining the interior of a lower portion of the container wall.

7. A container as claimed in claim 6 wherein said packing of fragments is surrounded by said sheath lining.

8. A container as claimed in any preceding claim in which the density of the packing material is about 15 to about 70 g per litre.

9. A container as claimed in claim 8 wherein said density is about 20 to about 50 g per litre.

10. A container as claimed in claim 9 wherein said density is about 25.5 g per litre.

11. A container as claimed in any preceding claim wherein the packing completely fills the interior volume of the container.

12. A container as claimed in claim 1 substantially as described in application 33680/78.

13. A container as claimed in claim 1 substantially as described herein with reference to Figs. 1 and 3 of the accompanying drawings taken together with Fig. 2, 4 or 5 of the accompanying drawings.

Printed for Her Majesty's Stationery Office
by Burgess & Son (Abingdon) Ltd —1980
Published at The Patent Office, 25 Southampton Buildings,
London, WC2A 1AY, from which copies may be obtained